Name: Date:

Polynomial Factoring solution (version 659)

1. **The quadratic formula says if $ax^2 + bx + c = 0$ then $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$. Use the quadratic formula to solve the following equation.**

$$x^2 - 4x + 31 = 0$$

Simplify your answer(s) as much as possible.

Solution

$$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(1)(31)}}{2(1)}$$

$$x = \frac{-(-4) \pm \sqrt{16 - 124}}{2(1)}$$

$$x = \frac{4 \pm \sqrt{-108}}{2}$$

$$x = \frac{4 \pm \sqrt{-36 \cdot 3}}{2}$$

$$x = \frac{4 \pm 6\sqrt{3}\, i}{2}$$

$$x = 2 \pm 3\sqrt{3}\, i$$

Notice that i in NOT under the square-root radical symbol!!

2. **Express the product of $-3 + 8i$ and $4 - 7i$ in standard form $(a + bi)$.**

Solution

$$(-3 + 8i) \cdot (4 - 7i)$$

$$-12 + 21i + 32i - 56i^2$$

$$-12 + 21i + 32i + 56$$

$$-12 + 56 + 21i + 32i$$

$$44 + 53i$$

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3. **Write function $f(x) = x^3 + x^2 - 14x - 24$ in factored form. I'll give you a hint: one factor is $(x + 2)$.**

Solution

	1	1	-14	-24
-2		-2	2	24
	1	-1	-12	0

$$f(x) = (x + 2)(x^2 - x - 12)$$

$$f(x) = (x + 2)(x + 3)(x - 4)$$

4. **Polynomial p is defined below in factored form.**

$$p(x) = (x + 2) \cdot (x - 1)^2 \cdot (x - 4)$$

Sketch a graph of polynomial $y = p(x)$.